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Subject: Re: Phthalate Action Plan introduction
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Attachments: [The Impact of EDCs on Hormones.docx](#)

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Attached is some information on phthalates as they relate to Native Americans and Native Alaskans. Larry

The Impact of EDCs on Hormones, and Health as they relate to indigenous communities

Endocrine disrupting chemicals may bind to an endocrine hormone's receptor, activating the hormone's production and triggering physiological processes. Conversely, some EDCs block endocrine hormones by binding to their receptors and blocking normal activation even in the presence of the natural hormones.

The concern has grown since even a low level of exposure to EDCs can affect body functions, particularly in the most vulnerable populations including infants and children, pregnant women, and those who are immune compromised or frail.

Of particular note, recent studies have shown the following:³⁻¹¹

- Exposure to pesticides like DDT can increase the risk for cardiovascular disease and inflammation in women who are premenopausal.
- Exposure to BPA has been linked to an increased risk of infertility, cancer, and metabolic disorders, including diabetes.
- Exposure to BPA during pregnancy may increase offspring's risk for developing diabetes or cardiovascular disease later in life.
- Early onset of menopause has been linked to 15 chemicals, including phthalates and PCBs.
- PCBs can interfere with thyroid hormone action in pregnant women, which may affect brain development in fetuses.
- Men, women, and children exposed to high levels of phthalates may have reduced levels of testosterone.
- Exposure to EDCs has been estimated to cost between 150-260 billion euros per year in the European Union due to contributing to a number of diseases and health conditions.

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2. Thayer KA, Doerge DR, Hunt D, et al. Pharmacokinetics of bisphenol A in humans following a single oral administration. *Environ Int.* 2015;83:107-115.

3. LaKind JS, Naiman DQ. Temporal trends in bisphenol A exposure in the United States from 2003-2012 and factors associated with BPA exposure: Spot samples and urine dilution complicate data interpretation. *Environ Res.* 2015;142:84-95.
4. National Toxicology Program. Center for the Evaluation of Risks to Human Reproduction. NTP-CERHR Monograph on the Potential Human Reproductive and Developmental Effects of
5. Bisphenol A. September 2008. NIH Publication No. 08-5994. Available at: <https://www.niehs.nih.gov/health/topics/agents/sya-bpa/index.cfm>
6. Tyl RW, Myers CB, Marr MC, et al. Two-generation reproductive toxicity study of dietary bisphenol A in CD-1 (Swiss) mice. *Toxicol Sci.* 2008;104(2):362-384.
7. Kobayashi K, Ohtani K, Kubota H, Miyagawa M. Dietary exposure to low doses of bisphenol A: effects on reproduction and development in two generations of C57BL/6J mice. *Congenit Anom (Kyoto).* 2010;50(3):159-170.
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With these in mind here are the reasons that Native Americans and Alaska Natives are at greater risk of adverse effects:

Alaska Natives, as well as American Indians in the Northern and Southern Plains, experience disproportionately higher lung cancer incidence rates compared to non-Hispanic Whites (NHW) and lung cancer tends to be diagnosed at a younger age among AI/ANs than among NHW (23% vs 16%) (1). For the period of 2012-2016, lung cancer was the leading cause of cancer death for AN/Ais (2). Additionally, Alaska Native people have a 53% higher lung cancer incidence rate than the NHW population (3). Incidence and mortality rates of ovarian and uterine cancer are also higher for AI/AN women than for White women (4). Alaska Native people also have significantly higher rates of laryngeal cancer than NHW (5), suggesting that these populations have multiple susceptibilities to negative health effects of asbestos exposure. According to the American Cancer Society, exposure to asbestos is also linked with stomach cancer. The stomach cancer incidence rate for AI/AN is 40% higher for men, and 70% higher for women, than that of the NHW population. The

mortality rate from stomach cancers is 210% higher for AI/AN men, and 200% higher for AI/AN women (6).

Disease Control and Prevention (CDC) American Indians/Alaska Natives (AI/AN) adults and youth have the highest prevalence of cigarette smoking among all racial and ethnic groups in the US (7), with more than 1 in 5 adults smoking cigarettes (8).

In addition to the cancers above, which are known to be caused by exposure to asbestos, EPA lists many other possible human health hazards it may consider in the risk evaluation, based on initial literature search. These possible health hazards were listed to generally include cancer, cardiovascular, developmental, endocrine, gastrointestinal, hematological and immune, hepatic, mortality, musculoskeletal, neurological, nutritional and metabolic, ocular and sensory, renal, reproductive, respiratory, and skin and connective tissue effects.

Multiple other susceptibilities may exist to the health hazards of asbestos exposure for Native Americans that are important to consider in this context. NTTC notes that the overall incidence of cancer in the AI/AN population is 30% higher than that for the NHW population (9). AI/ANs are 50% more likely to have coronary heart disease than the White population (10) and heart disease was the leading cause of death for AI/ANs (11) before the COVID-19 pandemic, followed by cancer, chronic liver disease, diabetes, and chronic lower respiratory infection (12), all of which fall under the potential health effects of asbestos EPA identified in the initial stages of their systematic review. Overall mortality for AI/ANs is about 50% higher than for the NHW population and life expectancy is shorter (13). According to the National Center of Education Statistics (14), AI/ANs represented the highest percentage of 3-21-year-olds served under the Individuals with Disabilities Education Act in 2015-2016, suggesting that the rate of developmental delays may be highest in this population, as well. According to the American Diabetes Association (15), AI/ANs have the highest rate of diabetes (an endocrine disorder) out of all ethnic/racial groups in the US, double that of NHWs. AI/ANs are 1.6 times more likely to be diagnosed with chronic liver disease than NHWs and chronic liver disease was the fourth leading cause of death for all AI/ANs and the second leading cause of death for AI/AN men in 2019 (16.) AI/AN people have higher rate of mortality from chronic liver disease, almost 4 times that of NHWs (17). AI/AN women are 2.2 times more likely to be diagnosed with chronic liver disease and 4.8 times more likely to die from it than NHW women. Liver cancer rates are also higher among AI/ANs than those of NHW (18) and AI/AN people are almost twice as likely to die from liver cancer (19). Prevalence of arthritis and rheumatoid arthritis is higher in the AN population (20, 21) and AI/AN people have a 20% higher chance of developing kidney cancer than NHWs (22). As far as potential respiratory health hazards, chronic respiratory disease also

disproportionately affects the AI/AN population (23). AI/AN children are twice as likely to have asthma than NHW children and AI/AN people are 20% more likely to have asthma than NHWs (24). COVID-19 is currently the leading cause of death in the AI/AN population¹⁶, with mortality rates ranging from 8.2 to 11.6 times those of NHWs (ages 20-49) (25).

1 <https://www.cdc.gov/cancer/uscs/about/data-briefs/no14-lung-cancer-incidence-AIAN-PRCDA-2012-2016.htm>

2 Centers for Disease Control and Prevention. Lung Cancer Incidence in the American Indian and Alaska Native Population, United States Purchased/Referred Care Delivery Areas—2012–2016. <https://www.cdc.gov/cancer/uscs/about/data-briefs/no14-lung-cancer-incidence-AIAN-PRCDA-2012-2016.htm>

3 Source: US HHS, NCI 2020. Seer Cancer Statistics Review, 1975-2016. Tables 1.20, 2.15 through 24.15, Source: NCI 2020. Seer Cancer Statistics Review, 1975-2016. Table 1.20 https://seer.cancer.gov/csr/1975_2016/sections.html and Alaska Native Epidemiology Center, http://anthctoday.org/epicenter/healthData/factsheets/Cancer_Mortality_statewide_09_03_2019.pdf

4 Singh SD et al. Ovarian and Uterine Cancer Incidence and Mortality in American Indian and Alaska Native Women, United States, 1999–2009. *Am J Public Health*. 2014 June; 104(Suppl 3): S423–S431.

5 Cancer in Alaska Native people 1969-2018, The 50-Year Report. http://anthctoday.org/epicenter/publications/Cancer_50year_Report/antr_fifty_year_report_web.pdf

6 NCI 2020. Seer Cancer Statistics Review, 1975-2016. Table 1.20 https://seer.cancer.gov/csr/1975_2016/sections.html

7 <https://www.cdc.gov/tobacco/disparities/american-indians/index.htm> 8 Tobacco Product Use Among Adults – United States, 2019. *Morbidity and Mortality Weekly Report* 2020.

9 Cancer and American Indians/Alaska Natives. <https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=31>

10 Heart Disease and American Indians/Alaska Natives. <https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=34>

11 Cardiovascular Health in American Indians and Alaska Natives: A Scientific Statement From the American Heart Association. Brethett K et al. *Circulation*. 2020;141:e948–e959

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<https://wonder.cdc.gov/controller/datarequest/D76;jsessionid=5A98E6E201F61ADF1CCC480C3E20>

13 https://www.cdc.gov/dhdsp/pubs/docs/sib_aug2015.pdf

14 https://nces.ed.gov/programs/raceindicators/indicator_rbd.asp

15 <https://www.diabetes.org/resources/statistics/statistics-about-diabetes>

16 <https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=32>

17 Suryaprasad, A et al. Mortality Caused by Chronic Liver Disease Among American Indians and Alaska Natives in the United States, 1999–2009. *Am J Public Health*. 2014 June; 104(Suppl 3): S350–S358.

18 <https://www.cdc.gov/cancer/uscs/about/data-briefs/no13-liver-cancer-incidence-AIAN-PRCDA-2012-2016.htm>

19 <https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=30>

20 Ferucci, ED et al. Arthritis Prevalence and Associations in American Indian and Alaska Native People. *Arthritis Rheum*. 2008 Aug 15; 59(8): 1128–1136.

21 Ferucci ED et al. Rheumatoid arthritis in American Indians and Alaska Natives: a review of the literature. *Semin Arthritis Rheum* 2005 Feb;34(4):662-7.

22 <https://minorityhealth.hhs.gov/omh/browse.aspx?lvl=4&lvlid=31>

23 Laffey, KG et al. Chronic respiratory disease disparity between American Indian/Alaska Native and white populations, 2011-2018. *BMC Public Health* 2021 Jul 28;21(1):1466. doi: 10.1186/s12889-021-11528-8.